

Engineering Institute and High-Performance Computing Systems Colloquium



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“A Bayesian Experimental Design Approach to Structural Health Monitoring”

Wednesday, July 21, 2010
10:00 - 11:30 AM

National Security Education Center, Los Alamos Research
Park, Suite 101A, Access Grid Conference Room

Abstract: Structural health monitoring (SHM) is the process of in-service data acquisition and real-time processing for effectively managing aerospace and civil structural systems with respect to the potential occurrence of damage. Bayesian experimental design deals with the minimization of the expected loss (Bayes Risk) of an experiment or test according to some loss function through modification of the test design parameters. This talk will discuss how a tailored Bayesian experimental design approach can improve, relative to current practice, the development of efficient damage detection algorithms and the optimization of SHM hardware design parameters, such as the placement of sensors. Particular focus will be on the use of networks of piezoelectric transducers for exciting and sensing ultrasonic guided waves in order to actively probe a structure for cracking, corrosion, and loss of bolt preload. With this application in mind, I will present some simulated and experimental results in support of the Bayesian experimental design framework.

Biography: Eric received his BS and MS in Engineering from Harvey Mudd College and Caltech, respectively. He is currently finishing his PhD in the department of Structural Engineering at the University of California, San Diego as a National Science Foundation Graduate Research Fellow. For the past five years, Eric has collaborated extensively with the LANL Engineering Institute on Structural Health Monitoring related research and technology development.

Note: The speaker is interviewing for a postdoc position in the High-Performance Computing Systems (HPC-3) group at LANL.